



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

June 18, 1999

The Honorable Edward J. Markey  
United States House of Representatives  
Washington, DC 20515-2107

Dear Congressman Markey:

Thank you for your April 5, 1999, letter following up on the letter you sent me on March 10, 1999. In the April 5 letter you highlight the issue of emergency diesel generator (EDG) reliability in light of a recent discovery of defective AR relays at the Seabrook nuclear power plant in New Hampshire. Furthermore, you reaffirm your March 10 recommendation that "the NRC should include backup diesel generator reliability in Y2K inspections and in periodic Y2K reports, require all licensees to have all backup electricity sources available at the turn of the year and other key Y2K dates, and ensure adequate fuel supply." Additionally, you request a response to three specific questions on the Seabrook matter.

The reported failure occurred with relays that are intended to automatically connect various circuits to the electrical bus powered by EDG B. However, we have further determined that the capability to manually connect the circuits to EDG B was always available and would have been the next step that the operators would have taken in an emergency. Similarly, the AR relay associated with the B Train EDG emergency power sequencer was incapable of automatically starting the Containment Building Spray (CBS) pump. However, operator action could have been taken to manually start the CBS pump, if needed. Therefore, backup power and CBS pump function were always available through manual action. However, the technical specifications (TSs) required that the EDG B be declared inoperable because it would not connect automatically during the test.

The EDG AR relays are part of the emergency power sequencer circuit, and are relied upon to open the offsite power breaker on a loss of offsite power to the safety-related bus to allow the EDG to automatically connect to the bus. If offsite power were lost when the AR relays were inoperable, the plant emergency operating procedures (EOPs) direct the operator to open the offsite power breaker manually from the control room. With the EDG running, this action would cause the EDG output breaker to automatically close and power the safety bus. In the event that the breaker failed to automatically close, an operator could manually close the breaker. During a loss-of-offsite-power event, operators have sufficient time to perform such manual functions when placing the plant in a safe shutdown condition.

There was also a concern that EDG A was inoperable because of maintenance and testing during a portion of the period of time that EDG B was incapable of automatic operation due to the defective AR relays. Preliminary information indicates that the cumulative number of days that EDG A was inoperable since June 1997 was actually a relatively small period of time totaling approximately 7.5 days. However, as discussed above, even though there were times that EDG A was not available because of maintenance or testing, emergency backup power via EDG B remained available through manual operator action.

The staff is following up on possible generic implications relating to the relay failure but at this time it appears to be unique to Seabrook. However, if we determine that this event is a generic concern, we will then inform the industry through the proper generic communication (information notice, generic letter, etc.). The NRC staff has addressed your three specific questions on the Seabrook matter in the enclosure.

In my May 3, 1999, response to your March 10, 1999, letter I addressed your recommendations relating to Y2K concerns and backup power. I described the NRC's integrated approach for addressing the Y2K issue. I also responded to your concern on EDG reliability. Consistent with the Commission's regulations, EDGs are highly reliable. The selected target EDG reliability values were established in accordance with the requirements of the station blackout rule. These values are tracked by each licensee per the requirements of the Maintenance Rule, and associated industry guidance. This tracking shows that the emergency diesel generators maintain the established reliability, and the existing regulations ensure that there is a high level of confidence that these diesel generators will be functional when needed. Licensees are required to monitor the performance of the EDGs against the established goals and to take appropriate corrective actions if the goals are not met. The Maintenance Rule requires that these goals be evaluated by the licensees at least every refueling cycle. Thus, existing requirements and regulations adequately ensure that these diesel generators are operable when needed and that their established reliability is maintained.

Additionally, we are confident that existing requirements for onsite power systems adequately address your suggestion that licensees be required to have all backup electricity sources available at the turn of the year and other key Y2K dates. Specifically, the operation and maintenance of the emergency diesel generators and other safety-related equipment necessary for the safe shutdown of the reactor are controlled by the plant TSs. The TSs are intended to ensure that sufficient power will be available to supply safety-related equipment at all times regardless of key Y2K dates. Moreover, the plant TSs require that action be taken to restore inoperable diesel generators to operable status. Furthermore, the NRC expects that, consistent with industry guidance, licensees will schedule and perform preplanned maintenance and testing related to backup power sources so that such activities do not coincide with the Y2K transition date.

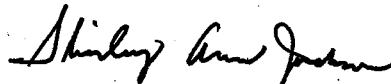
The adequacy of backup power systems has been demonstrated at numerous plants during weather-induced interruptions of the power grid and other types of past power grid failures. Regulations require the automatic capability of the EDGs to supply power to the safety loads to mitigate a design-basis accident coincident with a loss of offsite power; however, the likelihood of having an accident coincident with a loss of offsite power and a loss of redundant EDGs during the Y2K key dates is very low.

The scope of the licensees' Y2K program covers emergency onsite power and other emergency power systems at a nuclear plant. It is important to note that the onsite 7-day fuel oil capacity required by technical specifications is sufficient to operate the diesel generators for longer than the time that it takes to replenish the onsite supply from outside sources. The Y2K program also covers, through the Contingency Plan implementation, a plan for obtaining additional diesel fuel

and other necessary supplies to cope with potential Y2K-induced long-term loss of offsite power. As part of our reviews of licensee Y2K program implementation at all nuclear power plants, NRC inspectors will confirm that licensee Y2K programs address emergency power sources, arrangements for obtaining critical commodities (e.g., EDG fuel oil) and other considerations for contingency planning identified in NEI/NUSMG 98-07, "Nuclear Utility Year 2000 Readiness Contingency Planning." Finally, I note that in its most recent reports issued on January 11, 1999, and April 30, 1999, the North American Electric Reliability Council states, "Transmission outages are expected to be minimal and outages that may occur are anticipated to be mitigated by reduced energy transfers established as part of the contingency planning process." The report indicates that the transition through critical Y2K rollover dates should have a minimal impact on electric systems operations in North America and that widespread, long-term loss of the grid as a result of Y2K-induced events is not a credible scenario. Nevertheless, sufficient redundant backup power sources are currently present at nuclear plants because loss of offsite power and station blackout are issues that the nuclear industry has already addressed.

I would like to reaffirm that the Commission remains committed to ensuring that the NRC does what is necessary in its oversight of nuclear power plant licensee Y2K readiness efforts in order to assure safe operation of these facilities throughout 1999, 2000, and beyond. Please let me know if you have any additional questions on this matter.

Sincerely,

A handwritten signature in cursive script, appearing to read "Shirley Ann Jackson".

Shirley Ann Jackson

Enclosure:  
Staff Responses to Questions

**Staff Responses to Congressman Markey's Questions  
on Seabrook 3/31/99 Daily Event Report (DER 35535)**

The NRC staff has addressed the three questions in your April 5, 1999, letter as follows:

**Question 1:** If Seabrook tests its generators once a month, why did they not discover the generator was inoperable until the refueling outage? Does the NRC need to require licensees to test not only that the generators work but also that they are able to provide emergency power to the plants?

**Response:** The reported failure occurred in relays designed to control the automatic function to connect various circuits to the electrical bus powered by the EDG. As detailed in this letter, it was only the automatic loading feature that was inoperable and not the EDG. The monthly tests are not intended to test the automatic loading design feature associated with the emergency diesel generators (EDGs). Some design features, such as automatic loading, are tested only during a refueling outage. At Seabrook, the AR relays are part of the design that is tested only during a refueling outage. Although failures of any sort are rare, operating experience has shown that "failure to start" has been the dominant failure of EDGs, and fewer failures have involved other parts of the automatic circuitry associated with automatically loading the EDGs. This experience, the lesser significance of the automatic features and the potential undesirable impacts of additional testing (such as an operating plant transient associated with such testing) support the NRC's decision to not require more frequent testing of these automatic design features. These features are tested while the nuclear power plant is shut down, which normally coincides with the refueling outage. However, the NRC staff will continue to review EDG failure information and take any action needed.

**Question 2:** On what dates since June 1997 is it possible that neither of the two generators were operable at Seabrook, and hence that the plant had access to no backup power?

**Response:** The licensee's determination of the specific dates that EDG A was inoperable was reviewed by the staff. The preliminary information indicates that, since the last operating cycle of June 1997, EDG A was inoperable (i.e., unable to meet all technical specification requirements) for a total of approximately 7.5 days. During four of these days, EDG A was completely unavailable as a backup power source due to maintenance or testing. The time window when the redundant EDGs were considered inoperable is small and the likelihood of having an accident coincident with a loss of offsite power during this small time window is very low. Moreover, the failure of AR relays does not prevent the manual capability of the EDGs to power the safety buses. Our review regarding this concern is on-going, but we have not identified any period of time during the last operating cycle in which both the offsite power supplies and the EDGs would have all been unavailable. Therefore, even though there were times that EDG A

**ENCLOSURE**

was not available because of maintenance or testing, emergency backup power capability remained available.

Question 3: Please inform me of the results of the licensee's ongoing investigation into the failure of the B Train relays and into "the potential for similar issues with A Train AR relay."

Response: The licensee has completed its investigation into the root cause for the AR relay failures and has identified corrective actions to preclude recurrence. The staff has discussed the licensee's investigation, the licensee event report and root cause analysis with Seabrook personnel. The AR relay failure at Seabrook was caused by a combination of an improper calibration setting and corrosion products. The licensee did not detect incorrect calibration of the failed relays previously, since the tests performed did not verify all relay performance characteristics.

The corrosion products were created by the breakdown of the relay's neoprene cover gasket due to aging which affected the surface area of the relay contact, impeding the movement of the relay armature. To prevent recurrence, the licensee has cleaned the AR relay cases to remove any corrosion residue and replaced the relay internals and covers (gaskets) with new units for both the EDG A and EDG B emergency power sequencer circuits. The new relays utilize a cover gasket made of extruded neoprene, as opposed to molded neoprene, which was used in the original relays that failed. The licensee and vendor have confirmed that these relays were properly calibrated before installation and completed post-installation testing. Additionally, the licensee has revised its procedures for testing the AR relays to clarify techniques and acceptance criteria, including visually inspecting AR relays for signs of corrosion and gasket degradation, to incorporate the lessons learned from this event. Our review of this event is not complete at this time, but the results of our inspection will be documented in an NRC Inspection Report.